Remarks

Claims 1-19, as amended, are pending in this application. Claim 1 has been amended to clarify what is meant by the term "pitting" as that term is defined in the specification. As no new matter has been introduced, the entry of this amendment is warranted.

The sections set forth below are presented in the same order as that contained within the Office Action of June 25, 2004 for ease of reference.

Claim Rejections under 35 U.S.C. 102(e)

Claims 1, 3-13, 15-16 and 18-19 were rejected for allegedly being anticipated by Aga et al., U.S. Patent No. 6,372,609 ("Aga").

Claim 1 pertains to a method for preparing a semiconductor wafer, which includes treating a superficial zone that is supported by a wafer before conducting rapid thermal annealing to prevent "pitting" in the superficial zone during the rapid thermal annealing. The superficial zone has a thickness of less than 100nm (see page 6, line 26 of the present application), and the term "pitting" is defined in the specification as small holes or places on the wafer surface in the superficial zone wherein reconstruction smoothing by rapid thermal annealing is not fully achieved (see page 5, lines 4-8). In contrast, the conventional use of the term "pitting" concerns holes or defects that are embedded in the thickness of the wafer material.

The methods disclosed by Aga are directed to solving problems caused by defects, and thus Aga teaches curative treatments. In particular, the Aga patent discloses that an SOI layer 7 can include defects such as COPs (Crystal Originated Particles) that extend to the oxide film 3 under the damaged layer of silicon and which are not eliminated, and are sometimes enlarged, by heat treatment at a high temperature for an extended period of time. When this occurs, the buried oxide layer 3 may be etched by hydrogen or the like seeping in through defects to form etch pits that cause problems because the SOI layers near them are affected by them (see Aga, col. 2, lines 37-49 and Fig. 1E). Accordingly, an object of Aga is to provide a method of fabricating an high quality SOI waver using a hydrogen ion delamination method, wherein the damage layer present on the surface of the SOI layer after delamination, and the surface roughness, are removed, resulting in a uniformly thick SOI layer (see Aga, col. 2, lines 58-65). To achieve the stated object, Aga teaches to form an oxide film

on an SOI layer by heat treatment in an oxidizing atmosphere after a bonding heat treatment, removing the oxide film, and then subsequently heat treating in a reducing atmosphere (col. 2, line 66 to col. 3, line 5 and Figs. 1G to 1I). When the oxide film is formed, all or a part of the damage layer on the surface of the SOI layer is incorporated therein, so that when the oxide layer is removed (Fig. 1H) the damage layer is efficiently removed. When the SOI layer is subsequently subjected to heat treatment in a reducing atmosphere, the damage layer remaining on the SOI layer can be recovered and surface roughness improved. In this case, since all or part of the damage layer has already been removed, the heat treatment time can be short so that the SOI layer and a buried oxide layer will not be etched (see col. 3, lines 6-20 and col. 6, lines 55-64). Consequently, Aga does not suggest or teach to treat a superficial zone before conducting rapid thermal annealing to prevent pitting in the superficial zone during the rapid thermal annealing as recited in claim 1. Thus, claim 1 is not anticipated. Since claims 2-19 all directly or indirectly depend on claim 1, these claims also are not anticipated. In view of the above remarks, the applicant respectfully requests withdrawal of the 35 U.S.C. 102(e) rejections of the claims.

Claim Rejections under 35 U.S.C. 103(a)

Claim 2 was rejected for allegedly being unpatentable over Aga in view of admitted prior art on page 1, lines 19-23, wherein using RTA under a controlled atmosphere containing a mixture of hydrogen and argon, or pure argon, is described.

Claim 2 depends upon claim 1 which is patentably distinct from Aga as explained above. The description of utilizing RTA under a controlled atmosphere does not remedy the deficiencies of Aga, and thus claim 2 should be allowable for at least the same reasons as claim 1.

Claim 14 was rejected for allegedly being unpatentable over Aga in view of Nakashima et al., U.S. Patent No. 5,989,981 ("Nakashima").

Claim 14 indirectly depends upon claim 1, and recites a particular method for conducting a sacrificial oxidation step. As explained above, claim 1 is patentably distinct over Aga, and Nakashima does not remedy the deficiencies of Aga. Thus, claim 1 is patentably distinct thereover, and claim 14 should be allowable for at least the same reasons.

Claim 17 was rejected for allegedly being unpatentable over Aga in view of Park et al., U.S. Patent No. 6,566,198 ("Park").

Claim 17 depends upon claim 1, and recites conducting a sacrificial oxidation step after rapid thermal annealing. Claim 1 is patentably distinct over Aga, and Park does not remedy the deficiencies of Aga. Thus, claim 1 is patentably distinct thereover, and therefore claim 17 should be allowable for at least the same reasons.

In view of the above remarks, the applicant respectfully requests withdrawal of the 35 U.S.C. 103(a) rejections of dependent claims 2, 14 and 17.

Conclusion

In view of the above remarks, the applicants respectfully submit that the entire application is in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree that all pending claims are allowable, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of these claims.

Respectfully submitted,

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